

ABSTRACT

A preparation process of polyimide aerogels that composed of aromatic dianhydrides and aromatic diamines or a combined aromatic and aliphatic diamines is described. Also described is a process to produce carbon aerogels derived from polyimide aerogel composed of a rigid aromatic diamine and an aromatic dianhydride. Finally, the processes to produce carbon aerogels or xerogel-aerogel hybrid, both of which impregnated with highly dispersed transition metal clusters, and metal carbide aerogels, deriving from the polyimide aerogels composed of a rigid aromatic diamine and an aromatic dianhydride, are described. The polyimide aerogels and the polyimide aerogel derivatives consist of interconnecting mesopores with average pore size at 10 to 30 nm and a mono-dispersed pore size distribution. The gel density could be as low as 0.008 g/cc and accessible surface area as high as 1300 m²/g.